REMARKS

Applicant respectfully requests reconsideration. Claims 106-109 were previously pending in this application. Claims 106 and 107 have been amended for purposes of clarity and do not constitute narrowing amendments. Some deleted text, where required for clarity in claim 106, is indicated by placement within brackets. Claims 106-109 are pending for examination with claim 106 being an independent claim. No new matter has been added.

Rejection of Claims 106-109 under 35 U.S.C. §112, Second Paragraph

Claims 106-109 were rejected under 35 U.S.C. §112, ¶2 as being indefinite. The Office Action states that claim 106 has insufficient antecedent basis for the limitation "the main chain." Claims 107-109 depend from claim 106 and, thus, were also rejected on these grounds. Applicant has amended claim 106 to obviate the rejection on this ground by deleting the above-noted limitation.

The Office Action also states that there is insufficient antecedent basis for the limitation "R." Applicant has further amended claim 106 to remove "R" in this location, resulting in a heteroatom or metal in the polymer chain chosen from among N, P, S, As, Se, or -CC-M-CC- (as defined), or one of various recited bonds. Those of ordinary skill in the art will recognize the inherent presence of pendant atoms or groups on selected heteroatoms or other species recited in this structural claim.

Thus, amended claim 106, and its dependent claims, are definite. Accordingly, withdrawal of the rejection of claims 106-109 is respectfully requested.

Rejection of Claims 106-109 under 35 U.S.C. §112, First Paragraph

Claims 106-109 were rejected under 35 U.S.C. §112, ¶1 on the grounds that the specification does not reasonably enable an article comprising any conducting polymer having a structure as broadly claimed. Specifically, the Examiner asserts that there is insufficient guidance in the specification as to make and use the claimed compounds for any article "comprising the conducting polymer" moiety as defined. Applicants respectfully traverse the rejection.

Applicants respectfully submit that the Examiner has not met the required burden for making a rejection for non-enablement. The Patent Office must consider not just a single factor, but a totality of the circumstances involving many factors when making a determination that the application is not enabled. *In re Wands,* 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

Referring to *Wands* for a discussion of these factors, it is noted that they include (1) the breadth of the claims, (2) the nature of the invention, (3) the state of the prior art, (4) the level of one of ordinary skill in the art, (5) the level of predictability of the art, (6) the amount of direction provided, (7) the existence of working examples, and (8) the quantity of experimentation needed. As outlined in various PTO materials regarding enablement of chemical/biotechnical applications, it is improper to conclude that a disclosure is not enabling without careful review of all of these factors. Applicants submit that an analysis of the *Wands* factors weighs in favor of Applicants' assertion of enablement over the full scope of the claims, as discussed in detail below.

Breadth of the Claims

The breadth of the claims is reasonable in view of the teaching in the specification, as described further below in view of the other *Wands* factors. It is noted that the claims are not so broad as to encompass any conducting polymer according to the composition as recited in claim 106, as the Patent Office appears to imply. Instead, the claim encompasses a conducting polymer as further defined by the relatively detailed structure recited in the claims, in combination with a nanoscopic pathway, insulating dielectric, and a nanoscopic switch being capable of altering the conductivity of the nanoscopic pathway.

The Nature of the Invention

The nature of the invention is a novel article comprising a nanoscopic pathway including a conducting polymer, an insulating dielectric surrounding the nanoscopic pathway, and a nanoscopic switch in electronic communication with the nanoscopic pathway. Conducting polymers of the invention may be synthesized by methods known to those of ordinary skill in the art, in view of the teachings of the specification of this application.

The State of the Prior Art

The state of the prior art is advanced. The synthesis of a wide variety of conducting polymers has been studied in detail in the art, as described in the specification and in references of record in this application.

The Level of Ordinary Skill in the Art

The level of ordinary skill in the art is high. The relevant arts are organic chemistry, electrochemistry, and polymer chemistry. The skilled artisan is familiar generally with the synthesis of a wide variety of conducting polymers, including the systematic modification of monomer structure and controlled reactivity of monomers during polymerization, as illustrated by the references cited in the specification and of record in the application.

The Level of Predictability of the Art

With respect specifically to a conducting polymer having multiple reactive sites (the Patent Office suggests a need to set forth reactive/protective site control), the predictability of the art is reasonably high. For example, it is well known that conducting polymers can be formed by the electropolymerization of monomers at a defined electrochemical potential (see, e.g., Kingsborough, R. P. and Swager, T. M., *J. Am. Chem. Soc.* 1999, 121, 8825; Zhu, S. S. and Swager, T. M., J. Am. Chem. Soc. 1997, 119, 12568. See also, "Amount of Direction Provided," below).

The Amount of Direction Provided

The amount of direction provided by Applicants in the specification is substantial. Applicants provide, in the working examples and in the specification (page 21, lines 8-20), techniques that are applicable to the synthesis of conducting polymers in general, and the synthesis of such polymers for use in the present invention. For example, the examples teach methods for synthesis of monomers, which those of ordinary skill in the art would be able to modify using routine experimentation. As noted above, the Patent Office suggests a need to set forth reactive/protective site control. The examples also teach electropolymerization methods, including strategies for the selective polymerization of a polymerization site in the presence of other polymerization sites, based on the application of a defined electrochemical potential. For example, Example 5 describes the selective electropolymerization of electron-rich groups (e.g., 3,4-ethylenedioxythiophenes) that are oxidatively polymerized at lower potentials in the presence of relatively electron-poor groups (e.g., thiophenes) which require a more positive oxidation potential to undergo electropolymerization.

Additionally, in the specification (page 7, line 32 – page 8, line 7) and in references cited in the specification and of record in this application, Applicants indicate that several different conducting polymers can be used in the invention, including poly(phenylene ethynylene)s (Zhou, Q. et al., J. Am. Chem. Soc. 1995, 117, 12593) and polyanilines (Paul, E. W., J. Phys. Chem. 1985, 89, 1441).

The Existence of Working Examples

Applicants have provided eleven working examples which show that the claimed methods are effective in the synthesis of conducting polymers for use in the claimed invention. The methods described in the examples are not only applicable to synthesis of conducting polymers for use in the claimed invention, but many of these methods may be applied to any conducting polymer, or

precursors thereof, for formation of a variety of polymers without any level of undue experimentation.

The Quantity of Experimentation Needed

The amount of experimentation required to practice within the scope of the claims that stand rejected on this ground, in view of the totality of teachings of the specification of this application, is routine experimentation. Methods of synthesizing conducting polymers, in general, are well known. Additionally, the control of reactive sites versus protective sites (as specifically pointed out by the Patent Office) is generally well known, and one of ordinary skill in the art can determine and optimize the synthesis of a conducting polymer without undue experimentation. A survey of the prior art (references included in accompanying Information Disclosure Statement) provides evidence of the fact that synthetic methods for conducting polymers in general are known to those skilled in the art.

Therefore, a full and fair analysis of the *Wands* factors strongly suggests that the Applicants have enabled the claimed invention throughout its full scope. Withdrawal of the rejection under 35 U.S.C. §112, first paragraph, is respectfully requested.

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Respectfully submitted,

By_____

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